one from the group consisting of: a media server, download server, a video server, a hard disk drive, a CD rewriteable drive, and a read/write DVD drive.

43. (New) The method of claim 2, further comprising storing the plurality of encoded representations of the input media signal in a memory for streaming at least one of the encoded representations to a decoder.

44. (New) The medium of claim 9, wherein each of said encoded representations can be decoded independently of any other encoded representation.

45. (New) The system of claim 10, wherein each of said encoded representations can be decoded independently of any other encoded representation.

REMARKS

Applicants would like to bring to the Examiner's attention that a Second Information Disclosure Statement was filed on July 5, 2001 in the present application. No reference to this Second Information Disclosure Statement is shown, however, in the January 16, 2002 Office Action. Applicants have attached a copy of this Information Disclosure Statement and the cited reference for the Examiner's convenience.

In the Office Action, Claims 1-12, 14-17, 19-20, 22, 24-32, and 34-35 were rejected under 35 U.S.C. 102(e) as being anticipated by Boon (US 2001/0013952 A1). Claims 13, 18, 21, 23, and 33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Boon in view of Trans (US 2001/0038674 A1).

Claims 1-45 are now pending in the application after the above amendments.

Preliminary Discussion

The following discussion is provided solely to establish exemplary contexts within which aspects of the subject matter claimed in the present application may be appreciated. This discussion is not intended to define or limit the claimed invention(s) in any way.

One embodiment of the invention relates to encoding an input video stream to produce multiple encoded and compressed versions or representations of the stream. (See Section II of the Specification, titled "Overview of the Invention," page 12, lines 17-21) The different versions can be configured for real-time transmission at different data rates to different users depending upon, for example, the bandwidth of the transmission channel to each user. A high bit-rate/bandwidth version, for example, can be transmitted to a user having a high-bandwidth link to provide a high-quality video signal. A lower bit-rate/bandwidth version, for example, can

be transmitted to a user having a low-bandwidth link with a resulting lower quality signal. (See Specification, page 14, line 20 through page 15, line 3)

In accordance with one embodiment, different encoding parameters can be used during the encoding process for each of the multiple representations so that each representation is configured for its intended purpose. (See Specification page 14, lines 14-19) Representations can be configured for low, medium, or high bandwidth streaming, for example, or for decoding by low, medium, or high power processors. (See Specification, page 14, line 20 through page 15, line 3)

In accordance with one embodiment, a set of synchronization points is selected or identified in each of multiple encoded representations of a video stream. The synchronization points can enable a decoding processor to switch from decoding one representation to decoding another representation at any synchronization point, preferably in real-time. (See Section II of the Specification, titled "Overview of the Invention," page 12, lines 22-30) Each of the synchronization points in an encoded representation preferably has a corresponding synchronization point in the other representations. The corresponding synchronization points are preferably located at the same temporal location in each of the streams. (See Specification, page 21, lines 15-20) In one embodiment, the synchronization points are encoded frames that can be independently decoded without reliance upon any other encoded frame data. (See Specification, page 22, line 29 through page 23, line 3)

In accordance with one embodiment, data calculated based on the input signal in the encoding of one representation can be used to encode other representations. For example, color conversion can be performed once per frame with the resulting data being used to encode all representations. Motion vector data calculated for one representation can be used in the encoding of other representations. Also, in certain circumstances, calculated transform coefficients can be used in the encoding of multiple representations. (See Section II of the Specification, titled "Overview of the Invention," page 13, lines 6-13)

Discussion of the Cited Art

Boon discloses techniques for encoding and decoding image blocks that make up a display image. Boon does not, however, disclose encoding of an input media signal to generate a plurality of encoded representations of the media signal. Boon also does not disclose using a set of data generated based upon an input signal to generate a plurality of independent encoded

representations of the media signal. Furthermore, Boon does not disclose the identification or selection of synchronization points or synchronization frames at which a switch from a decoding of one representation of the signal to the decoding of another representation of the signal can be performed without discontinuity.

As illustrated by Figure 4 of Boon, an image block is encoded using one of two methods. In a first method shown by steps Sa3-Sa5, only a shape signal of the block is encoded. In a second method shown by steps Sa6-Sa9, a shape signal and a texture signal are both encoded. In Boon, although different methods can be used for encoding different blocks, only one method is used for encoding any one block as clearly shown by Figure 4. Accordingly, for any display image made up of plural encoded blocks, the encoding process disclosed in Boon can yield one and only one encoded representation of the image. Since a video signal is made up of a sequence of display images (frames), and only one encoded representation of each frame is produced, only one encoded representation of the video signal is produced in accordance with the teachings of Boon.

As discussed in the previous paragraph, Boon does not disclose or even suggest the generation of multiple encoded representations of an input signal. It logically follows, therefore, that Boon also does not teach the use of data generated from an input signal to generate multiple encoded representations of the signal.

As illustrated by Figure 1(a), Boon discloses a 32-bit synchronous signal 501 or 601 that merely serves to identify the beginning of a coded signal. As stated in Boon, "The synchronous signal 501 is a signal indicating the head of a coded arbitrary shape signal corresponding to one object, and this is a unique coded signal." (See Boon, paragraph 0181, lines 1-3) Although Boon does disclose such a synchronous signal, Boon does not disclose a synchronization point at which a switch can be made from decoding one representation of an input signal to decoding another representation of the input signal. Indeed, since Boon in no way even mentions the generation or use of multiple encoded representations of a signal, Boon logically cannot teach switching between the decoding of different representations.

Trans discloses a system and method for increasing bandwidth on a network. As indicated by the abstract, nodes on the network are synchronized with each other and channels between the nodes are measured and calibrated for optimal bandwidth. In the Office Action, the

Examiner relied upon Trans merely to show the use of a server for transmitting data and to show the use of interleaved data.

Response to Rejections

Applicants will treat all of the cited references as prior art for purposes of responding to the outstanding Office Action, but reserve the right to demonstrate their own prior invention at a later date. By focusing on specific references, claims and limitations, Applicants do not imply any agreement with the Examiner's assertions with respect to other references, claims, and limitations.

As to Claims 1-8 and 36-43

In the Office Action, the Examiner takes the position that Claim 1 is anticipated by Boon.

Independent Claim 1, as amended, recites "encoding said input media signal to generate the plurality of encoded representations." As discussed above, however, Boon does not disclose encoding an input media signal to generate a plurality of encoded representations.

Claim 1 also recites "designating a plurality of synchronization points such that switching between a decoding of one of said encoded representations and another of said encoded representations can be performed with no substantial discontinuity." As discussed above, Boon also does not disclose any synchronization point such that a switch can be made between a decoding of one representation and a decoding of another representation.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 1 is not anticipated by Boon. Accordingly, Claim 1 should be allowable.

Claims 2-8 and 36-43 depend from Claim 1 and should likewise be allowable for at least the reasons set forth above with respect to Claim 1. These dependent claims also recite additional patentable distinctions over the cited art. For example, Claim 2, as amended, recites "wherein each of said encoded representations can be decoded independently of any other encoded representation," and Claim 36 recites "wherein said plurality of encoded representations are interleaved in an output file or output stream."

As to Claims 9 and 44

In the Office Action, the Examiner takes the position that Claim 9 is anticipated by Boon.

Independent Claim 9 recites "encoding said input media signal to generate a plurality of encoded representations." As discussed above, however, Boon does not disclose encoding an input media signal to generate a plurality of encoded representations.

Claim 9, as amended, also recites "indicating a plurality of synchronization points such that switching between a decoding of one of said encoded representations and another of said encoded representations can be performed with no substantial discontinuity." As discussed above, Boon also does not disclose any synchronization point such that a switch can be made between a decoding of one representation and a decoding of another representation.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 9 is not anticipated by Boon. Accordingly, Claim 9 should be allowable.

Claim 44 depends from Claim 9 and should likewise be allowable for at least the reasons set forth above with respect to Claim 9.

As to Claims 10-14 and 45

In the Office Action, the Examiner takes the position that Claim 10 is anticipated by Boon.

Independent Claim 10, as amended, recites "a video encoder configured to generate said plurality of encoded representations of said video input sequence." As discussed above, however, Boon does not disclose the generation of a plurality of encoded representations of a media signal such as a video sequence.

Claim 10 also recites "the video encoder is further configured to designate a plurality of synchronization points such that switching between a decoding of one of said encoded representations to another of said encoded representations can be performed with no substantial discontinuity." As discussed above, Boon also does not disclose any synchronization such that a switch can be made from decoding one representation to decoding another representation.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 10 is not anticipated by Boon. Accordingly, Claim 10 should be allowable.

Claims 11-14 and 45 depend from Claim 10 and should likewise be allowable for at least the reasons set forth above with respect to Claim 10. These dependent claims also recite additional patentable distinctions over the cited art. For example, Claim 11, as amended, recites "wherein each synchronization point corresponds to a substantially similar temporal location within each of the encoded representations."

As to Claims 15-19

In the Office Action, the Examiner takes the position that Claim 15 is anticipated by Boon.

Independent Claim 15, as amended, recites "output comprising a plurality of independent encoded representations of said digital video input sequence." As discussed above, however, Boon does not disclose the generation of a plurality of encoded representations of a media signal such as a video sequence.

Claim 15 also recites "wherein each encoded representation contains synchronization frames identifying locations at which a switch from a decoding of one of said encoded representations to another of said encoded representations can be performed with no substantial discontinuity occurring during said switch." But, as discussed above, Boon nowhere discloses any synchronization point or synchronization frame at which a switch can be made from decoding one representation to decoding another representation.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 15 is not anticipated by Boon. Accordingly, Claim 15 should be allowable.

Claims 16-19 depend from Claim 15 and should likewise be allowable for at least the reasons set forth above with respect to Claim 15. These dependent claims also recite additional patentable distinctions over the cited art. For example, Claim 18, as amended, recites "a server configured to transmit at least one of said encoded representations over a communications network for a real-time presentation."

As to Claims 20-23

In the Office Action, the Examiner takes the position that Claim 20 is anticipated by Boon.

Independent Claim 20, as amended, recites "A data file containing a plurality of independent encoded representations of a video sequence." As discussed above, however, Boon does not disclose a plurality of encoded representations of a media signal such as a video sequence. Accordingly, Boon logically cannot and does not disclose a data file containing a plurality of encoded representations of a video sequence.

Claim 20 also recites "a first set of synchronization frames." As discussed above, Boon also does not disclose any synchronization point or synchronization frames.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 20 is not anticipated by Boon. Accordingly, Claim 20 should be allowable.

Claims 21-23 depend from Claim 20 and should likewise be allowable for at least the reasons set forth above with respect to Claim 20. These dependent claims also recite additional

patentable distinctions over the cited art. For example, Claim 23, as amended, recites "synchronization information comprising locations of synchronization points within said data file."

As to Claims 24-33 and 38

In the Office Action, the Examiner takes the position that Claim 24 is anticipated by Boon.

Independent Claim 24, as amended, recites "using said set of data to generate the plurality of encoded representations of said input media signal." As discussed above, however, Boon does not disclose the generation of a plurality of encoded representations of a media signal.

Claim 24 also recites "wherein each encoded representation is encoded according to a different set of encoding parameters." Fundamentally, Boon does not teach the use of data generated from an input signal to generate multiple encoded representations of the signal. Moreover, while the Examiner correctly notes that in Figure 24(c) Boon "shows shape and texture using different parameters," Figure 4 of Boon clearly shows that these "different parameters" are parts of a single set of parameters used to produce a single representation of an input signal or image. Thus, Boon does not show that each of a plurality of representations is encoded according to a different set of encoding parameters.

Since Boon teaches neither of the above-referenced limitations, Applicants submit that Claim 24 is not anticipated by Boon and should be allowable.

Claims 25-33 and 38 depend from Claim 24 and should likewise be allowable for at least the reasons set forth above with respect to Claim 24. These dependent claims also recite additional patentable distinctions over the cited art. For example, Claim 30, as amended, recites "wherein said set of data comprises transform data."

As to Claim 34

In the Office Action, the Examiner takes the position that Claim 34 is anticipated by Boon.

Independent Claim 34, as amended, recites "using said set of data to generate a plurality of independent encoded representations of said input media signal." Claim 34 also recites "wherein each encoded representation is encoded according to a different set of encoding parameters." As discussed above with reference to Claim 24, Boon teaches neither of these

limitations. Claim 34, therefore, is not anticipated by Boon, and Applicants respectfully submit that Claim 34 should be allowable.

As to Claim 35

In the Office Action, the Examiner takes the position that Claim 35 is anticipated by Boon.

Independent Claim 35, as amended, recites "said video encoder using said set of intermediate encoding data to generate said plurality of independent encoded representations of said video input sequence." As discussed above, however, Boon does not disclose the generation of a plurality of encoded representations of a media signal.

Claim 35 also recites "wherein each encoded representation is encoded according to a different set of encoding parameters." As discussed above, with reference to Claim 24, Boon does not teach the use of data generated from an input signal to generate multiple encoded representations of the signal.

Since Boon teaches neither of the above-referenced limitations, Applicants respectfully submit that Claim 35 is not anticipated by Boon and should thus be allowable.

CONCLUSION

In view of the foregoing remarks, Applicants submit that the application is in condition for allowance. If, however, issues remain which can potentially be resolved by telephone, the Examiner is invited to call the undersigned attorney of record at his direct dial number of (949) 721-6377.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 5/15/02

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MARKED-UP VERSIONS SHOWING AMENDMENTS TO THE APPLICATION

In the Claims

1. (Amended) A method of producing a plurality of ~~synchronized~~ encoded representations of an input media signal, the method comprising:

providing ~~an~~ the input media signal;

encoding said input media signal to generate ~~a~~ the plurality of encoded representations, wherein each representation is encoded according to a different set of encoding parameters; and

~~identifying a number~~ designating a plurality of synchronization points ~~in each of said encoded representations~~ such that switching between a decoding of one of said encoded representations and another of said encoded representations can be performed with no substantial discontinuity.

2. (Amended) The method of claim 1, wherein each of said encoded representations can be decoded independently of any other encoded representation ~~wherein said synchronization points facilitate a switching from a streaming of one of said encoded representations to another of said encoded representations with no substantial discontinuity occurring during said switching~~.

3. (Amended) The method of claim ~~2~~ 1, wherein each of said encoded representations can be decoded starting at said synchronization points.

4. (Amended) The method of claim ~~3~~ 1, wherein a temporal period between any two adjacent synchronization points ~~in an encoded representation~~ does not exceed a specified maximum temporal period.

5. (Amended) The method of claim ~~4~~ 1, wherein each synchronization point ~~has~~ corresponds to a substantially similar temporal location within each of the encoded representations.

6. (Amended) The method of claim ~~5~~ 1, wherein said input media signal comprises a video input sequence, wherein said video input sequence comprises frames of digital video, and wherein said synchronization points ~~comprise~~ correspond to encoded frames of digital video.

7. (Amended) The method of claim 6 further comprising:

identifying a frame in said input sequence;

encoding said identified frame to produce an encoded frame of a first encoded representation, wherein a decoding of said encoded frame of said first encoded representation does not require a decoded version of another frame;

identifying said encoded frame of said first encoded representation as corresponding to a synchronization point;

encoding said identified frame to produce an encoded frame of a second encoded representation, wherein a decoding of said encoded frame of said second encoded representation does not require a decoded version of another frame; and

identifying said encoded frame of said second encoded representation as corresponding to a synchronization point.

8. (Amended) The method of claim ~~7~~ 1, wherein at least a portion of each of said encoded representations is generated before any encoded representation is completely generated.

9. (Amended) A computer readable medium having stored thereon a plurality of instructions which, when executed by a processor in a computer system, cause the processor to perform the steps of:

accepting an input media signal;

encoding said input media signal to generate a plurality of encoded representations, wherein each encoded representation is encoded according to a different set of encoding parameters; and

~~identifying a number~~ indicating a plurality of synchronization points ~~in each of said encoded representations~~ such that switching between a decoding of one of said encoded representations and another of said encoded representations can be performed with no substantial discontinuity.

10. (Amended) A system for producing a plurality of encoded representations of a video input sequence comprising:

a video encoder configured to generate said plurality of encoded representations of said video input sequence, wherein said video encoder encodes each representation according to a different set of encoding parameters ~~and wherein each encoded representation contains synchronization frames~~, and wherein the video encoder is further configured to designate a plurality of synchronization points such that switching between

a decoding of one of said encoded representations to another of said encoded representations can be performed with no substantial discontinuity; and

an output module configured to output said encoded representations.

11. (Amended) The system of claim 10, wherein each synchronization point corresponds to a substantially similar temporal location within each of the encoded representations~~wherein said synchronization frames facilitate a switching from a streaming of one of said encoded representations to another of said encoded representations with no substantial discontinuity occurring during said switching~~.

12. (Amended) The system of claim ~~11~~ 10, further comprising: a storage device configured to store said encoded representations.

13. (Amended) The system of claim ~~11~~ 10, further comprising: a server, configured to transmit at least one of said encoded representations over a communications network for a real-time presentation, said server responsive to a transition signal to switch from transmitting one of said encoded representations to transmitting another of said encoded representations to a client without a substantial interruption in said real-time presentation.

14. (Amended) The system of claim ~~11~~ 10, further comprising: a decoder configured to decode a frame preceding a ~~first~~ synchronization ~~frame~~ point in one of said encoded representations, then to decode a ~~second synchronization~~ frame corresponding to the synchronization point in another of said encoded representations~~, said second synchronization frame having substantially the same temporal location as said first synchronization frame~~.

15. (Amended) A video encoding system comprising:

a host computer;

a digital video input sequence;

~~an~~ output ~~stream~~ comprising a plurality of independent encoded representations of said digital video input sequence, wherein each representation is encoded according to a different set of encoding parameters, and wherein each encoded representation contains synchronization frames~~, and wherein said synchronization frames facilitate~~ identifying locations at which a switching from a ~~streaming~~ decoding of one of said encoded representations to ~~a streaming of~~ another of said encoded representations can be performed with no substantial discontinuity ~~occurring during said switch~~; and

a video encoding application operating on said host computer, wherein said video encoding application generates said output ~~stream~~ from said digital video input sequence.

16. The system of claim 15, wherein said video encoding application is configured to generate a set of data from said digital video input sequence, said video encoding application using said set of data to generate said plurality of encoded representations of said digital video input sequence.

17. (Amended) The system of claim ~~16~~ 15, further comprising: a storage device used to store said encoded representations.

18. (Amended) The system of claim ~~16~~ 15, further comprising: a server, configured to transmit at least one of said encoded representations over a communications network for a real-time presentation, said server responsive to a transition signal to switch from transmitting one of said encoded representations to transmitting another of said encoded representations to a client without a substantial interruption in said real-time presentation.

19. (Amended) The system of claim ~~16~~ 15, further comprising: a decoder configured to decode a frame preceding a first synchronization frame in one of said encoded representations, then to decode a second synchronization frame in another of said encoded representations, said second synchronization frame having substantially the same temporal location as said first synchronization frame.

20. (Amended) A data file containing a plurality of independent encoded representations of a video sequence comprising:

a first of said encoded representations having a first set of synchronization ~~points~~ frames; and

a second of said encoded representations having a second set of synchronization ~~points~~ frames, wherein each of said second set of synchronization frames is associated with one of the first set of synchronization frames having a substantially similar temporal location in the video sequence~~points has a temporal location within said second encoded representation that corresponds substantially to a temporal location within said first encoded representation of one of said first set of synchronization points~~.

21. (Amended) The data file of claim 20, wherein said encoded representations comprise segments, and wherein ~~said~~ segments of said first encoded representations are interleaved in said data file with segments of said second encoded representation.

22. (Amended) The data file of claim 20, wherein each of said encoded representations ~~exist in~~ is included contiguously ~~blocks~~ within said data file.

23. (Amended) The data file of claim ~~22~~ 20, further comprising: synchronization information, said synchronization information comprising locations of synchronization points within said data file.

24. (Amended) A method of producing a plurality of encoded representations of an input media signal comprising:

providing ~~an~~ the input media signal;

generating a set of data ~~from~~ based upon said input media signal; and

using said set of data to generate ~~a~~ the plurality of encoded representations of said input media signal, wherein each encoded representation is encoded according to a different set of encoding parameters.

25. The method of claim 24, wherein each of said encoded representations is a complete and separate representation of said input media signal.

26. The method of claim 24, wherein any one encoded representation can be decoded without reference to another encoded representation.

27. The method of claim 24, wherein said set of data comprises intermediate encoding data.

28. (Amended) The method of claim ~~27~~ 24, wherein said input media signal is a video input sequence comprising frames of digitized video.

29. The method of claim 28, wherein said set of data comprises transform data.

30. The method of claim 28, wherein said set of data comprises discrete cosine transform data.

31. The method of claim 28, wherein said set of data comprises motion vector data.

32. The method of claim 28, wherein said set of data comprises color converted frame data.

33. The method of claim 28, wherein said set of data comprises resampled frame data.

34. (Amended) A computer readable medium having stored thereon a plurality of instructions which, when executed by a processor in a computer system, cause the processor to perform the steps of:

accepting an input media signal;

generating a set of data from said input media signal; and

using said set of data to generate a plurality of independent encoded representations of said input media signal, wherein each encoded representation is encoded according to a different set of encoding parameters.

35. (Amended) A system for producing a plurality of encoded representations of a video input sequence comprising:

a video encoder configured to generate a set of intermediate encoding data from said video input sequence, said video encoder using said set of intermediate encoding data to generate said plurality of independent encoded representations of said video input sequence, wherein each encoded representation is encoded according to a different set of encoding parameters; and

an output module configured to output said encoded representations.

36. (New) The method of claim 2, wherein said plurality of encoded representations are interleaved in an output file or output stream.

37. (New) The method of claim 2, wherein the input media signal comprises a plurality of different media sources.

38. (New) The method of claim 37, wherein the media sources comprise at least one from the group consisting of: audio segments, video frames, graphics, and still images.

39. (New) The method of claim 2, wherein said input media signal comprises video and audio.

40. (New) The method of Claim 2, wherein each of said encoded representations is a representation of a portion of the input media signal.

41. (New) The method of Claim 2, wherein each of said encoded representations is a representation of the entire input media signal.

42. (New) The method of claim 2, further comprising storing the plurality of encoded representations of the input media signal in a memory, wherein the memory comprises at least one from the group consisting of: a media server, download server, a video server, a hard disk drive, a CD rewriteable drive, and a read/write DVD drive.

43. (New) The method of claim 2, further comprising storing the plurality of encoded representations of the input media signal in a memory for streaming at least one of the encoded representations to a decoder.

44. (New) The medium of claim 9, wherein each of said encoded representations can be decoded independently of any other encoded representation.

45. (New) The system of claim 10, wherein each of said encoded representations can be decoded independently of any other encoded representation.